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This reports covers the **aerosol ocean** and **aerosol land** algorithm, the **NIR water vapor** algorithm and our involvement in the **fire algorithm**.

Main topics addressed in this quarter:

1. Iteration with SDST and Version 1 delivery *(Gao, Mattoo)*
2. TARFOX field experiment *(Kleidman, Remer et al.).*
3. ATBD delivery for aerosol*(Chu, Kaufman)* Water vapor *(Chu, Gao)* Fire *(Justice)*
4. Analysis and documentation of the SCAR field experiment data *(Kleidman, Chu Li, Remer)*
5. Laboratory experiment, in the Forest Service Fire Lab. with an CIA / John Hopkins Univ. instrument to test the relationship between remote sensing of fires and the emission of aerosol and trace gases from them*(Kaufman, Wald, Korb).*
6. Development of a new technique for remote sensing of dust over land using IR channels, to supplement present algorithm for remote sensing of aerosol from MODIS *(Wald ,Tanre, Kaufman)*
7. Submission of papers on remote sensing of aerosol over land / water and comparison of AERONET and in situ size distributions for JGR special issue *(Kaufman, Tanré, Remer).*
8. Continued validation of all algorithms *(Kaufman, Chu).*
9. Discussion of fire alarm and fire control products with USFS (Ward) and Univ. of Montana *(Kaufman)*.
10. The "FIRE" paper describing MODIS fires *(Kaufman, Justice, Flynn).*
11. Size distribution and phase function of new smoke model *(Remer).*
12. Analysis of the meaning of remote sensing of aerosol, the meaning of optical thickness, for understanding the aerosol effect on clouds, radiation and atmospheric chemistry*(Kaufman, Tanre).*

Topics postponed to next quarter

1. Validation of water vapor algorithms *(Chu, Gao)*
2. Lookup tables for the land and ocean algorithms *(Chu, Mattoo)*
3. Finish of the urban / industrial aerosol paper*(Remer et al.),*
4. Test of the accuracy of separating the aerosol modes in the ocean program. Other sensitivity study *(Tanré).*

Plans for the next quarter:

1. Analysis of the SCAR-B MAS data for fires, smoke, surface properties and clouds*(Chu, Kleidman, Li, Remer).*
2. Analysis of the fire lab data
3. smoke aerosol model
4. dust aerosol model
5. ATBD review

1. Version 1 delivery

We continued to interact with the SDST team in preparation of the algorithm for the proper format, integration of the auxiliary data and of data from other MODIS algorithms. The codes were tested for software accuracy/consistency and for robustness using sensitivity studies. Input data sets, like the aerosol dynamical models were developed and implemented into the codes. The Version 1 software for all algorithms were submitted and accepted by SDST in September.

2. TARFOX

The TARFOX experiment yielded 4 excellent ER-2 flights over the deep ocean with airborne sun photometry carried at low altitude by the C131. These will form an excellent validation test bed for the aerosol over water algorithms. The experiment also produced a data set of AERONET sun and sky measurements for validation and refining the urban/industrial aerosol model.

3. ATBD delivery

Delivered on time.

4. Analysis of the SCAR field experiment data

This includes producing a hard copy of MAS imagery for the entire flight and all flights during SCAR-B, preparation of data for validation of algorithms, preparation of program for analysis of fires in Brazil and MODIS observations of the fires.

5. Laboratory experiment at USFS Fire Lab

Laboratory experiment, in the Forest Service Fire Lab. with an CIA/John Hopkins Univ. micro-FTIR to test the relationship between remote sensing of fires and the emission of aerosol and trace gases from them. We collaborated with the ASTER group from JPL. Approximately 25 fires were observed. The instrument performed well and the in-house development of calibration techniques and the innovative signal reducing screen appear to have functioned properly.

6. Remote sensing of dust using IR techniques

The development of a new technique for remote sensing of dust over land using IR channels is progressing well. Retrieval of optical thickness is confirmed using ground-based sunphotometry for optical thickness less than 1.0 or greater than 1.0, but is less accurate when optical thickness is close to 1.0.

7. Papers submitted to JGR special issue.

3 papers were submitted to the special issue on remote sensing of aerosol

8. Validation

A detailed validation of the remote sensing of aerosol from MODIS using Landsat and MAS data was included in the papers in the special issue.

9. Fire alarm and fire control product from EOS-AM1

We are working together with the Forest Service Fire Lab. on generation of a fire alarm and on the use of remote sensing data for fire fighting activities.

10 Fire Paper

A paper that describes the fire algorithm for MODIS is in final stages of preparation, together with Chris Justice, and other co-authors. It includes the rational, sensitivity studies and limited validation of the procedure.

11. Smoke aerosol model

Using the full three year AERONET data base collected in Brazil (1993-1995) a new smoke model was started. The data show a basic consistency with the previous model developed using a subset of the 1993 data, alone. There are differences. Further testing is needed and in situ data analyzed before a new model can be incorporated in the algorithm.

14. Meaning of remote sensing of aerosol

A sensitivity study was performed on the meaning of remote sensing of aerosol from space. Even though the remote sensing products are the optical thickness and over the ocean the particle size, these products are used to derive the aerosol mass concentration and radiative forcing. The sensitivity study showed that there are preferable scattering angles for remote sensing of aerosol mass concentration and radiative forcing from space. It also showed that the overall error in the derived mass concentration and radiative forcing due to uncertainty in the aerosol size distribution is smaller than the error in remote sensing of the optical thickness itself.

Problems, complaints

1. Effects of the EOSDIS delay on the algorithm production and validation.

2. We were not aware of the presumed shift in the IR channels (3.75 and 3.96 μm by 40-50 nm) way out of specs, and the uncertainty in the exact location. We shall wait for the final information on these specs.